

# Linking Mass Flux and Discharge to Remedial Performance and Objectives

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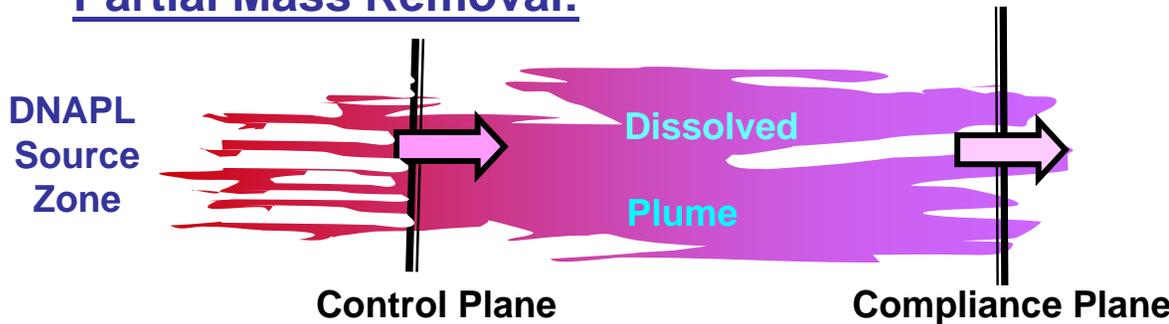
- When is mass discharge [M/T] an appropriate metric?
- When is mass flux [M/L<sup>2</sup>/T] relevant?
- How to consider the size of the site?
  - Volume of NAPL [L<sup>3</sup>]
  - Cross sectional area to flow [L<sup>2</sup>]
  - Volume of NAPL contaminated media [L<sup>3</sup>]
- Should average mass flux be considered?
  - Area averaged over?

To predict down-gradient plume response  
 We need to know mass flux and/or discharge at the source zone  
 and the Attenuation Capacity of the Aquifer

Pre-Remediation:

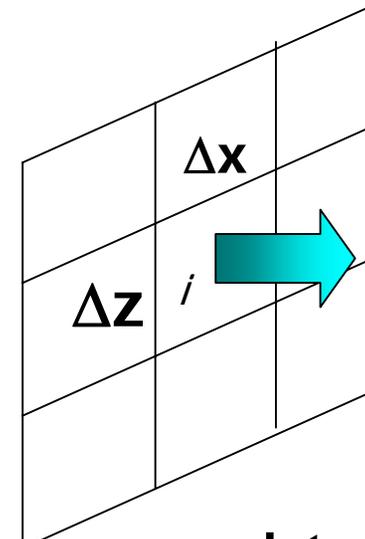


Partial Mass Removal:



$$M_d = \sum J_i A_i$$

Control Plane (CP)

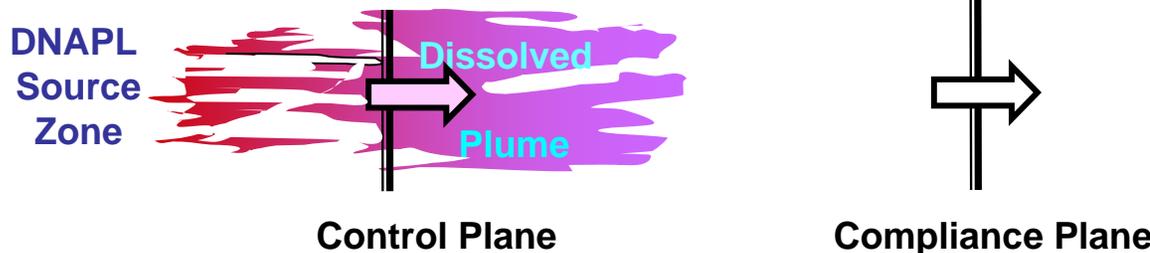


$$A_i = \Delta x \Delta z$$

$$J_i = q_i C_i$$

$$q_i = -K_s i$$

Partial Mass Removal + Enhanced Natural Attenuation:



If we know the attenuation capacity of the aquifer we can determine an acceptable mass flux given some compliance point location

# A Tale of Three Sites

Site	Volume NAPL [L]	NAPL contaminated media [m <sup>3</sup> ]	Max Mass Flux (g/m <sup>2</sup> /day)	Average Mass Flux (g/m <sup>2</sup> /day)	Mass Discharge (g/day)
Sages Dry Cleaner	30	420	2.2	0.1	0.35
Hill AFB OU-2	1,300	6,700	16	2.5	96
Ft. Lewis EDGY	2,500	70,000	18	1.6	750

Which data best characterized conditions at the site and relevance to the plume?

# Research needed linking source flux to plume response and attenuation capacity of the aquifer

